PRECISE ENVIRONMENTAL
Consulting Environmental Scientists

PRELIMINARY SITE CONTAMINATION ASSESSMENT

Multiple Allotments

Mount Burrell / Kunghur, New South Wales

NCV Enterprises Pty Ltd

May 2019

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File reference:	PE2706.18_Mount Burrell_PSCA_v1.1		
Title:	Preliminary site contamination assessment Multiple lots, Mount Burrell / Kunghur, New South Wales		
Client:	NCV Enterprises Pty Ltd		
Client contact:	Cherie Stokes		

Distribution:

Version	Status	Date	Recipient
1	Superseded	25 March 2019	NCV Enterprises Pty Ltd Planit Consulting
1.1	Final	13 May 2019	NCV Enterprises Pty Ltd Planit Consulting

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1 INTRODUCTION

Precise Environmental (PE) was commissioned by NCV Enterprises Pty Ltd (the client) to complete a preliminary site contamination assessment, comprising a desktop site history review and site inspection, for the proposed Nightcap Village precinct at Mount Burrell, New South Wales. The site and individual allotments which are north of Kyogle Road (each defined in Section 2, Table 1) are shown in Appendix A, Figure 1 and Figure 2.

The Nightcap Village will consist of a maximum of 393 residential dwellings. The preliminary development layout is included in Appendix A, Figure 2. Given the current rural use of the land and the proposed higher density residential use in particular areas, the purpose of PE's preliminary assessment was to undertake a high-level assessment of potential contamination risk to determine what steps will be necessary to determine if the relevant development areas are suitable (or can be made suitable) for the proposed use.

The methodology applied is consistent with the first stages of the contaminated land assessment process required under State Environmental Planning Policy 55 and typically triggered by local Council for such developments.

1.1 Objectives

The objectives of the works were to:

- Identify past and present potentially contaminating activities and potential contaminants of concern (PCoC)
- Define areas of potential concern (AoPC) and areas for proposed development where detailed investigation of PCoC may be warranted according to proximity and risk of potential impacts.

1.2 Scope of work

The scope of work included:

- Review of available aerial photographs of the investigation area held by NSW Finances, Services & Innovations
- Review of current certificates of land title
- Review of available allotment plans
- A Government Information (Public Access) search through Tweed Shire Council (TSC) regarding past or present potentially contaminated land activities at the site
- Liaison with the TSC Environmental Health Department
- Search of the NSW Government Environment Protection Agency (EPA) website for records of licenses under the Protection of the Environment Operations (PoEO) Act 1997 or notices under the *Contaminated Land Management Act 1997* (CLM Act)
- Department of Defence search for unexploded ordnance
- Review of available published information regarding site conditions, e.g. geology sheet, soil maps and notes, etc.
- TSC cattle dip search
- Search of the NSW Department of Primary Industries (DPI) Office of Water (OoW) groundwater bore database

- Discussions with current site owners/occupiers to ascertain previous land use activities (where possible)
- Detailed site inspection
- Incorporation of the findings into this report.

Guidance considered in conducting this scope of work included:

- Australian Standard: Guide to the investigation and sampling of sites with potentially contaminated soil, Part 1: Non-volatile and semi-volatile compounds - (AS 4482.1-2005)
- Australian Standard: Guide to sampling and investigation of potentially contaminated soil, Part 2: Volatile substances - (AS 4482.2 1999)
- Contaminated land management: Guidelines for the NSW Site Auditor Scheme (3rd edition) (EPA 2017)
- Contaminated Sites: Guidelines for Consultants Reporting on Contaminated Sites (OEH 2011)
- Contaminated Sites: Guidelines for the Assessment and Management of Groundwater Contamination (DEC 2007)
- National Environmental Protection (Assessment of Site Contamination) Measure 1999 (NEPC 2013a and 2013b).

1.3 Limitations

The findings of this report are based on the objectives and scope of work outlined above. PE performed the services in a manner consistent with the normal level of care and expertise exercised by members of the environmental assessment profession. No warranties or guarantees, express or implied, are made. Subject to the scope of work, PE's assessment is limited strictly to identifying typical environmental conditions associated with the subject property, and does not include evaluation of any other issues.

This report does not comment on any regulatory obligations based on the findings, for which a legal opinion should be sought. This report relates only to the objectives and scope of work stated, and does not relate to any other works undertaken for the Client.

The report and conclusions are based on the information obtained at the time of the assessment. Changes to the subsurface, site or adjacent site conditions may occur subsequent to the investigation described herein, through natural processes or through the intentional or accidental addition of contaminants, and these conditions may change with space and time.

The site history, and associated uses, areas of use, and potential contaminants, were determined based on the activities described in the scope of work. Additional site history information held by the Client, regulatory authorities, or in the public domain, which was not provided to PE or was not sourced by PE under the scope of work, may identify additional uses, areas of use and/or potential contaminants. The information sources referenced have been used to determine site history and desktop information regarding local subsurface conditions. While PE has used reasonable care to avoid reliance on data and information that is inaccurate or unsuitable, PE is not able to verify the accuracy or completeness of all information and data made available.

Further chemicals or categories of chemicals may exist at or adjacent to the site, which were not identified in the site history, and which may not be expected at the site. The absence of any identified hazardous or toxic materials on the subject property should not be interpreted as a warranty or guarantee that such materials do not exist on the site. If additional certainty is required, additional site history or desktop studies, or environmental sampling and analysis, should be commissioned.

The results of this assessment are based upon site inspection and fieldwork conducted by PE personnel and information provided by the Client. Any samples collected at specific locations, and should be considered to be an approximation of the condition of the sample.

All conclusions regarding the property area are the professional opinions of the PE personnel involved with the project, subject to the qualifications made above. While normal assessments of data reliability have been made by PE, PE assume no responsibility or liability for errors in any data obtained from regulatory agencies, or information from sources outside of PE's control, or developments resulting from situations outside the scope of this project.

2 SITE IDENTIFICATION AND ENVIRONMENTAL SETTING

2.1 Site and surrounding land use and environment

Individual allotments included within the site boundary are detailed in Table 1.

Table 1. Site identification.

Allotment	Area (ha) *	Street address
Lot 4 DP737440	90.82	2924 Kyogle Road, Kunghur, NSW
Lot 1 DP1183098	3.02	2954 Kyogle Road, Kunghur, NSW
Lot 1 DP390311	162.27	
Lot 1 DP611556	5.06	
Lot 2 DP582300	71.71	
Lot 2 DP611556	122.40	
Lot 3 DP755714	37.94	
Lot 5 DP582299	134.1	
Lot 8 DP755714	16.19	
Lot 11 DP1194471	126.60	
Lot 19 DP755714	48.56	
Lot 22 DP755714	46.54	
Lot 31 DP755714	88.03	
Lot 32 DP755714	125.45	
Lot 33 DP755714	9.90	
Lot 35 DP755714	30.76	
Lot 121 DP134446	158.17	
Lot 34 DP755714	47.04	2956 Kyogle Road, Kunghur, NSW
Lot 2 DP1148316	81.51	3222 Kyogle Road, Mount Burrell, NSW
Lot 20 DP755714	177.25	

* Areas provided by Planit Consulting

Zoning and land use details are provided in Table 2 and corresponding maps are attached in Appendix B.

Table 2. Zoning and land details.

Aspect	Detail
Total site area	≈1.583.32 ha
Local Government	Tweed Shire Council (TSC)
Parish	Kunghur / Burrell
County	Rous
Current zoning (TSC)	TSC Local Environmental Plan (LEP) 2014 mapping shows the site as predominantly being within 'RU2 – Rural landscape' zone and a small section on the eastern side of the site being within 'RU5 – village' zone.

Aspect	Detail
Proposed zoning	It is unknown whether any zoning changes will be required to enable the development.
Existing land use and site structures	A mixture of remnant bushland and native plantation covers the majority of the site with access tracks throughout. Cleared areas with rural use including numerous houses and sheds are present predominantly through the centre, south and east. Key site features are shown in Appendix A, Figures 3 - 5.
Proposed land use	Construction of up to 393 residential dwellings in select areas among some existing land uses. Low lying land may potentially be used as a water supply dam in the future.
Surrounding land use	National Parks and nature reserves (Mebbin state forest) lie along the western site boundary and rural landscape generally surrounds the remaining site boundaries. Denser housing, a café and service station / general store are located ~ 40 m from the south side boundary between Kyogle Road and the Tweed River (which borders the site).
Site services and underground infrastructure	Dial before you dig (DBYD) plans for the site (attached in Appendix A) show that power is above ground (visually confirmed through site inspections) with underground earthing. While not provided through the search, it is assumed that telecommunications are also present above ground. No municipal water supply, sewage or stormwater network are present in the area.
Potential migration pathways associated with underground infrastructure	While some localised underground services may be present around serviced structures (e.g. piping from a water tank), the predominant soils are clay and the services do not route to external infrastructure (e.g. trunk mains). This particular migration pathway risk is therefore considered negligible.

Closest sensitive environment details are provided in Table 3 and corresponding maps are attached in Appendix B.

Table 3. Closest sensitive environment details.

Environmental feature	Approximate distance from site
Council land mapping (TSC 2019)	
National parks:	Along the entire western border lies Mebbin National Park, part of the world heritage listed Gondwana Rainforests of Australia.
Area of environmental significance:	880 m northeast – environmental protection (habitat). A regional fauna corridor crosses through the site connecting Mebbin National Park and Nightcap National Park.
2009 Vegetation mapping vegetation types within and surrounding site:	Native plantation, grey ironbark / white mahogany / grey gum open forest complex, substantially cleared of native vegetation, tallowwood open forest, flooded gum open forest, Sydney blue gum open forest. The above information source mapping could not be saved for inclusion in the report appendices, however a map of broader vegetation classification is included in Appendix B.

Environmental feature	Approximate distance from site
Bushfire prone land:	The majority of the site and surrounding locale are mapped as vegetation category 1 bushfire prone land surrounding locale. Vegetation buffers and small sections of vegetation category 2 are also present within and surrounding the site.
Farmland protection project and significant farmland protection:	Applies to sections of the Tweed River running along the southern site boundary and adjacent to the southeast site boundary.
Native Title:	There are no active native titles across the site or within 1 km of the site boundary.
Council waterway information (TSC 2019)	
Area of environmental significance – state and local significant wetlands and aquatic systems:	The Tweed River abuts the east and south site boundaries is mapped as part of the Clarence River catchment which does not have water quality objectives (WQOs). As the site is directly upstream from the Tweed River catchment, the 'uncontrolled streams' WQOs could be adopted and include: aquatic ecosystems, visual amenity, primary and secondary contact recreation, livestock water supply, irrigation water supply, homestead water supply, drinking water at point of supply (disinfection only, clarification and disinfection, and groundwater) and aquatic foods (cooked).
Natural waterbody:	Byrrill Creek runs adjacent to the northern boundary with one of its tributaries, Kunghurloo Creek, entering the site across the northern boundary and continuing south and spreading throughout the site. Kunghur Creek lies 410 m east and is connected to the Tweed River. Numerous drainage lines are present throughout the property.
Dam:	4,400 m east – Clarrie hall dam
Drinking water catchment:	Mapped across entire site and surrounding locale, and expected to eventually report to Clarrie Hall Dam.
Future water storage facilities:	TSC map the western half of the site and surrounding locale as a future water storage facility, however a plan provided from Planit Consulting shows a future dam would not extend as far as the western site boundary (see Appendix C).
Groundwater vulnerability:	Groundwater vulnerability mapped across the site corresponds with the elevation. The western side of the site (higher elevation) is mapped as moderately low vulnerability, central and eastern areas are mapped as moderately vulnerable and a small section on the eastern side (towards Tweed River) is mapped as moderately high vulnerability.

2.2 Local meteorology

The weather station applicable for site climatic data is Murwillumbah (Bray Park) Site no. 058158. Temperature and rainfall data from 1972 to 13 Feb 2019 were reviewed on the Bureau of Meteorology climate averages website as shown in Table 4.

Table 4. Local meteorology details – accessed 12 February 2019.

Site coordinates	28.46 °S, 153.21 °E
Weather station coordinates	28.34 °S, 153.38 °E (≈19 km from site).
Weather station elevation	8 m.
Mean maximum temperature	Highest between December and February with a range of 29.1 – 29.6 °C.
Average monthly rainfall	Highest between January and March with a range of 204.1 – 224.1 mm.

2.3 Geology and hydrology

Hydrology and geology, including topography and hydrogeology, details for the site are provided in Table 5.

Table 5. Topography and hydrology details.

Aspect	**Detail**
Elevation and topography	The site topography is highly variable, with contours ranging from 80 m to 220 m. A contour map is included in Appendix B.
Direction of stormwater drainage	Due to the large site area and topography, stormwater pathways are numerous and variable. However, TSC mapping identifies the drainage routes of concern (see Appendix B), with potential receptors being the waterways identified in Table 3.
Onsite surface waters	Kunghurloo creek flows from Byrrill Creek north of the site and traverses across the site. Numerous dams are located within the site and are shown in the figures in Appendix A. Tweed River abuts the site though is understood to be outside the site boundary.
Geology	The geological map of NSW maps the geology of the western locale of the site as Jurassic sedimentary rocks and the eastern locale of the site is mapped as Triassic-Jurassic sedimentary rocks.
Flood potential	The site is not mapped within a flood potential zone.
Registered groundwater bores in the locale	
Nearest groundwater bore information (NSW OoW map and bore reports provided in Appendix D)	North: stock and domestic bore (GW307369) ~ 375 m
	East: domestic and commercial bore (GW306754) ~ 750 m
	Eastern border: domestic bore (GW306896)
	South: domestic bore (GW303196) ~ 2.1 km
Total depth	GW307369 – 42.0 m
	GW306754 – 120.0 m
	GW306896 – 36.0 m
	GW303196 – 24.0 m

Aspect	Detail
Soil profiles (m)	GW307369 (0 – 12) Soil – red, with clay content (12 – 18) Shale (18 – 42) Basalt
	GW306754 (0 – 2) Topsoil (2 – 6) Sandstone (6 – 7) Basalt (7 – 15) Sandstone (15 – 43) Basalt – fractured (43 – 70) Basalt – solid (70 – 111) Basalt – fractured (111 – 113) Limestone (113 – 120) Basalt
	GW306896 – Not recorded on bore log.
	GW303196 (0 – 1) Topsoil (1 – 15) Clay (15 – 19) Basalt (19 – 20) Shale (20 – 24) Basalt
Upper water bearing zone (upper aquifer depth)	GW307369 – 27 to 30 m
	GW306754 – 105 to 111 m
	GW306896 – Not recorded on log
	GW303196 – 19 to 20 m
Standing water level (SWL)	GW307369 – 23.0 m
	GW306754 – 80.0 m
	GW306896 – Not recorded on bore log.
	GW303196 – 15.0 m
Aquifer confined / unconfined	Where recorded, all upper water bearing zones are below/within bedrock, with the rise of the SWLs above the water bearing zones indicating positive pressure. These conditions indicate that the aquifer(s) are confined.

2.4 Summary of the environmental setting of the site

The site is situated within a rural landscape zone with a small section in the eastern area zoned as a village. The site is a mixture of virgin sclerophyll open forest and highly modified / disturbed land which comprises open space with sparse rural residential development and native plantation. Mebbin National Park is a world heritage listed and borders the west of the site. Land uses are similar in the locale, with some denser housing, a small service station / general store and café beyond a portion of the south site boundary.

Site topography is variable with approximate elevations ranging from ~80 – 220 m, with numerous drainage lines that traverse the site and are expected to report to surrounding waterways which form part of the Clarrie Hall Dam catchment. Future water storage facilities are mapped across the western portion of the site; the layout differs somewhat from the potential future dam layout included in the development plans. PE understands the TSC have earmarked four possible sites for a future dam within the Shire and therefore there is no guarantee the dam will be constructed within the site bounds.

Reviewed records for registered groundwater bores nearest the site confirm clay soils are present over bedrock which primarily comprises basalt and shale. Where recorded, the upper water bearing zones (upper aquifers) were within bedrock and resulted in rises of SWL which is indicative of confining conditions.

Media that are considered most vulnerable to contamination within the bounds of the subject site are surface soils around structures and storage areas, areas where any broad application of chemicals may have occurred (e.g. plantations), and water and sediment within damns that are down gradient of potential contaminant sources.

Investigation of seasonally perched groundwater (if soils are conducive to inundation and accumulation of perched water) and offsite surface waters would only be triggered where significant contamination is identified within the above listed media.

3 LAND USE ACTIVITIES – DESKTOP SEARCHES AND ANECDOTAL INFORMATION

3.1 Government searches

The details of government searches undertaken by PE for the site are provided in Table 6. Search documents are provided in Appendix E.

Table 6. Government searches.

Search	Search details	Date of search
NSW Environmental Protection Authority (EPA)	No record of a licence, application or notice under the Protection of the Environment Operations (PoEO) Act 1997 or notices under the Contaminated Land Management (CLM) Act 1997 were found for any properties in the Kunghur and Mount Burrell areas. The register of contaminated sites notified to EPA for the TSC region does not include any properties in the Kunghur and Mount Burrell region.	21 February 2019
Unexploded ordnance (UXO)	The Department of Defence UXO mapping system does not show any UXO areas in the Kunghur and Mount Burrell region. The closest areas are Kyogle and Brunswick Heads and are mapped as 'UXO Area: Other'.	18 February 2019
Hazardous chemical licenses	Given the established site history, rural-residential setting, absence of commercial/industrial activities and observations during an inspection of the site (Section 3.3), searches of the Stored records held by WorkCover NSW is not justified.	N/A
TSC Government Information (Public Access) Act 2009 (GIPA) search	A GIPA search was undertaken through TSC, with results received on 25 February 2019. The results included: • A development application (DA) and supporting documentation / report from 2006 for a 'rural village' • Council meeting minutes and conditions relating to the above DA, with the following note in relation to SEPP 55: *'Contamination reports have been undertaken and the matters in the SEPP have been satisfied. The site is not contaminated.'* • The results of contaminated land searches in 2008 for Lot 3 DP 771335 and Lot 121 DP 134446, Kyogle Road, Kunghur which stated: 1. The radial search revealed there to be no known Dip Site within 200 metres of the subject property. 2. Data records reveal no known potentially contaminating activities on the subject site. 3. The topographical maps referenced below indicate no known potentially contaminating activities on the subject site. • Onsite sewage management system approvals from 2010 for Lot 3 DP 771335 and Lot 2 DP 771335, 2954 Kyogle Road Kunghur	18 February 2019

Search	Search details	Date of search
	• Onsite sewage management system approval from 2013 for Lot 121 DP 134446, 2984 Kyogle Road, Kunghur.	
Cattle dip site locator	A search of the NSW Department of Primary Industries cattle dip site locator website identified 'Backblocks' cattle dip within the bounds of the site, with a licensed/lease expiry date of 30 June 1994. The record details that the dip is demolished, however no other details are provided. Subsequently, PE contacted the NSW Department of Primary Industries to ascertain if any additional information exists for the dip; a response was received from Mr George Nastase that included the following: • A mid 1990s audit diagram placed the site about 25 m to the west of the then existing creek. • A circa 1985 file stated that the dip bath, while under lease, was leaking and the whole site had deteriorated significantly despite one of the conditions required of the landowner/s was to maintain that site. • The dip was demolished by machinery later in 1985 - without any notice made to the Department - with only the nearly empty bath left • The Tick program then filled in the bath with gravel & earth and no further work was done on that site by anyone. NSW Agriculture relinquished the lease in 1994 • It is assumed that there is probably some level of soil contamination in the proximity of the bath with the persistent chemicals being arsenic and DDT. Mr Nastase noted in a follow-up email that remediation works could have occurred without the Department's knowledge, though that would be unusual given the professional and bureaucratic input typically required. Two other dips are located just outside the site boundary as follows: • Byrrill Creek dip situated ~45 m northeast of site with the status listed as standing • Kunghur dip situated ~90 m southeast of the site on the other side of the Tweed River with the status listed as decommissioned.	18 February 2019

PE attended the TSC chambers in Murwillumbah on 25 March 2019 to view historical topographical maps held by Council. The maps that were available for the subject area were as follows:

- Tyalgum Sheet 9541-III, Edition 1, Series R 753, 1:50000, dated 1969
- Brays Creek 9541-III-S, First Edition, 1:25000, not dated (assumed 1975 based on information in Section 3.5)
- Brays Creek 9541-3S, Second Edition, 1:25000, dated 1986
- Brays Creek 9541-3S, Third Edition, 1:25000, dated 2002.

Photographs of relevant sections of the maps are included in Appendix E. Features of relevance to the subject PSCA included:

1969

- Byrrill Creek Yards, Kunghur Yards and Dip, and Mount Burrell Yards and Dip – all outside the site boundary
- Forest coniferous or pine plantation beyond (outside of) the northwest site boundary
- No vineyard, orchard or plantation within the site boundary.

1975

- Offsite dips as above as well as the Backblocks Dip within the western site bounds
- Two sawmills (one unnamed, the other being Kunghurloo Sawmill) are within the site; these correspond with two mills observed during the site inspection – see Section 4
- A landing ground in the north of the site
- No vineyard, orchard or plantation within the site boundary
- Medium and dense timber in sections of the site.

1986

- Dips, sawmills, landing ground and timber as per 1975
- No vineyard, orchard or plantation within the site boundary
- Several dams within the site.

2002

- Backblocks Dip (onsite) and Byrrill Creek Yards no longer shown
- Landing ground not shown
- Closed and open forest (medium and dense timber) across more of site
- No vineyard, orchard or plantation within the site boundary.

3.2 Aerial photograph interpretation

Aerial photographs of the site were obtained from NSW Finances, Services & Innovations to establish the historic use of the site. An additional photograph from 1954 was reviewed from a report previously prepared for a part of the site by Cardno (Qld) in 2008 – refer Section 3.5. The aerial photographs are attached in Appendix F.

Potentially contaminating activities (PCA) that could be observed in the photographs are detailed in Table 7. Descriptions of particular areas and named structures are in Section 4 and are shown in Appendix A, Figures 3 – 5.

Table 7. Aerial photograph interpretation.

Year of photograph	Indicators of potentially contaminating land use activities
1954	The photograph does not encapsulate the entire site, however a small structure is apparent in the northwest of Lot 4 DP737440 as are a number of smaller structures across Lot 121 DP134446,
1962	The Backblocks cattle dip is apparent in the west of the site as is a building known to be a sawmill (referred to as Sawmill 2) with smaller surrounding structures. A house and nearby sheds (referred to as House 1, Shed 1, Mechanical Shed and Shed 2) were present in the central south while a nearby feature to the west is unidentifiable. The Byrrill Creek cattle dip can be seen north of the site boundary. The majority of the site had been cleared with exception of the northwest corner and central south. No large scale plantations are evident.
1971	Vegetation regrowth is notable in the centre and south of the site. Structures described in the 1962 photograph remain with the exception of the unknown feature near to House 1 which is no longer evident.
1979	A building known to be a piggery had been constructed west of the site centre. No other significant changes evident.
1987	The Shed 4 – 6 area and Shed 9 and 10 area had been developed.
1997	The Shed 7 and 8 area had been constructed while it appears that construction may also have started on House 2.
2004	Buildings around Sawmill 2 had been cleared, the cattle dip is no longer visible and the piggery appears party demolished.
2016	All site features shown in Appendix A, Figures 3 – 5) that could be inspected are detailed in Section 4.

3.3 Anecdotal information

During the site inspection completed early March 2019, PE liaised with the property owner Mr Peter van Lieshout, and the caretaker of the 'Bhula Bhula' property Mr Mark McMurtrie (Gunhambadi Jakamarra). The following information was provided:

- The property was historically owned by a Mr Banting and operated as a cattle farm (year unknown)
- Ownership was by "Walters" in the 1960s
- Mr Van Lieshout's interest in the property began in the early 1990s when he was part of a group looking to undertake eco-development on the site
- Mr Van Lieshout later purchased the property when the style/nature of development could not be agreed upon
- Native tree plantations present on the site commenced at two distinct times; 22 years ago and 12 years ago, with harvesting typically after 40 years of growth

- The 22 year old plantation was started by the Forestry Department (i.e. Government) while the 12 year old plantation was started by Forest Enterprises Australia (FEA)
- FEA used herbicides across 1,000 acres to clear groundsel and other weeds prior to starting the plantation
- The cattle dip in the northwest of the site (Backblocks) was decommissioned circa 1998, with removal of contaminated soil and potentially backfilling with concrete
- Neither Mr Van Lieshout nor Mr McMurtrie had any knowledge of historical banana plantations on the site.

3.4 Historical title search

The current titles for each of the 20 allotments that comprise the site were obtained from NSW Land Registry Services through CITEC Confirm. The registered owners are detailed in Table 8 and the title documents are in Appendix G.

Table 8. Registered owners of site allotments.

Allotment	Registered owner	Allotment	Registered owner
Lot 4 DP737440	Kemp Cove Pty Ltd	Lot 19 DP755714 *	Zimmer Land Pty Ltd
Lot 1 DP1183098	Zimmer Land Pty Ltd	Lot 22 DP755714 *	
Lot 1 DP390311		Lot 31 DP755714	
Lot 1 DP611556		Lot 32 DP755714 *	
Lot 2 DP582300		Lot 33 DP755714	
Lot 2 DP611556 *		Lot 35 DP755714	
Lot 3 DP755714		Lot 121 DP134446	
Lot 5 DP582299		Lot 34 DP755714	Darko Kovac, Dolph Cooke and Peter Anthony van Lieshout
Lot 8 DP755714 *		Lot 2 DP1148316	Wollumbin Horizons Pty Ltd
Lot 11 DP1194471		Lot 20 DP755714 (A & B)	

The allotments denoted by an asterisk in Table 8 include forestry rights (timber) to the Forestry Commission of NSW, expiring in December 2033. Registered owner names / companies do not indicate potentially contaminated land activities, however additional information is provided in Section 3.5.

Development application documents obtained through the GIPA search included a plan showing ownership and zoning details. This plan from 2006 is included in Appendix G and details the following:

- Lot 34 DP755714: Andre Stafleu, Florian Alexandre Stafleu, Ingrid Cosima Stafleu and Peter Anthony van Lieshout
- Lot 4 DP737440: Kempcove Pty Ltd
- Remainder of property shown in map: Zimmer Land Pty Ltd.

Appendix G also contains registered plans / historical title document provided by Planit Consulting. Where historical ownership details were included, there were no indicators of potentially contaminating activities.

3.5 Other information

Other lines of enquiry identified the following information which has relevance to the site. The documents are included in Appendix H.

Cardno (2008) report

Cardno was engaged by Peter van Lieshout to undertake a contaminated land assessment over five of the allotments covered by PE's investigation; these were as follows:

- Lot 3 DP771335
- Lot 4 DP737440
- Lot 121 DP134446
- Lot 3 DP755714
- Lot 34 DP755714.

The assessment comprised a desktop review only. Key findings separate to those described throughout this PE report include:

- Council contaminated land searches for each allotment did not identify any contaminating land uses, including a review of s.149 planning certificates (Section 149 of the Environmental Planning and Assessment Act 1979)
- A review of Council topographic maps which did not identify any potentially contaminating activities in the five allotments prior to 1986, though noted the presence of the Kunghur Yards cattle dip to the southeast – the maps included:
    - Brays Creek 9541-111-S 1:25,000 1975
    - Brays Creek 9541-111-S 1:25,000 1986
    - Brays Creek 9541-3-S 1:25,000 1986
    - Brays Creek 9541-3S 1:25,000 2002
    - Tyalgum 9541-111 1:50,000 1969.

Cardno concluded, based on the information reviewed, that there was no evidence of any known potentially contaminating activities on the site, with no further investigations recommended.

Tweed Daily News article

An online news article by Tweed Daily News from 17 April 2010 details that FEA planted 240,000 eucalyptus trees across 300 hectares of the subject property, with harvest due *circa* 2024. However, the company went into voluntary liquidation with Peter van Lieshout to regain control of the land and trees within if ongoing if leasing payments could not be made.

Northern Star article

An online news article by Northern Star from 12 August 2017 describes the 'Bhula Intentional Community' which was constructed in the southwest of the site (assumed to be near the House 1 area detailed in Section 4) without necessary development consent. No specific details on potentially contaminating land use activities are included in the article, though this information will contribute to future investigation works in the subject area.

Eucalyptus plantation

In combination with the information provided by Mr Peter van Lieshout regarding plantation timing, Planit Consulting has provided a plan which shows areas of 'clearable plantation'. These areas are represented in Appendix A, Figure 2, where it can be seen how the plantation areas correspond with proposed dwelling clusters.

4 SITE INSPECTION, AOPC AND PCOC

PE conducted a detailed inspection of the site in early March 2019 which included identification of the following:

- Areas of potential concern (AoPC) – areas where land use activities (past or present) have a risk of contaminating environmental media
- PCoC – particular contaminants relevant to the land use activities undertaken in each AoPC
- Other site features – notable structures, areas of human disturbance and/or natural formations that present a low contamination risk and may not require any further action.

The above determinations were based upon observation of:

- Waste storage and disposal
- Disturbed, discoloured or stained soil, and obvious presence of fill such as stockpiles or bulk topsoil with differing colour or texture to surrounds
- Disturbed / distressed vegetation
- Presence of chemical containers, holding tanks, drums
- Chemical odour
- Quality of surface water
- Condition of buildings / structures, hardstand, roads etc.

PCoC that are relevant to the site, based on the inspection outcome and information collated in Section 3, are described in Table 9. Individual AoPC and other site features are outlined further below in Table 10 along with photographs and descriptions.

Table 9. Description of PCoC.

PCoC	Description and common relationship
Metals	Arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc. Pest control, chemicals and wastes.
TRHs, BTEXN PAHs and lead	Total recoverable hydrocarbons (TRHs) F1 (C_6 – C_{10}), F2 (>C_{10} – C_{16}), F3 (>C_{16} – C_{34}), F4 (>C_{34} – C_{40}); benzene, toluene, ethylbenzene, meta- para- & ortho- xylenes, naphthalene (BTEXN); polycyclic aromatic hydrocarbons (PAHs). Typical contaminants associated with fuels, oils and lubricants – lead additives banned in early 2000s. PAHs may also be present in combusted material (ash).
OCPs and OPPs	Organochlorine pesticides (OCPs) and organophosphorus pesticides (OPPs). Pest control and wastes.
Herbicides	Chemicals that can have selective toxicity to specific plant/weed species, or non-selective toxicity that can destroy any vegetation species. Commonly include glyphosate, phenoxy acid and metsulfuron methyl compounds.
Asbestos	Asbestos is a mineral associated with general building products, insulation, piping and underground services, and vehicle brake pads and gaskets. Asbestos can be found in several forms. The use of crocidolite (blue) asbestos was banned in Australia in 1967, while the use of amosite (brown) asbestos continued in the construction industry until the mid-1980s. It was finally banned from building products in 1989, though it remained in gaskets and brake linings until 31 December 2003, and cannot be imported, used or recycled.

Table 10. Site inspection details.

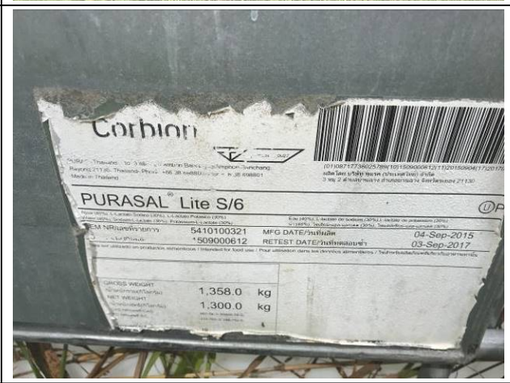
Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 2 DP1148316	House 1	Timber clad house with metal roofing. Sewage discharged to rubble drain.	Low risk though will require investigation as it is located in a proposed dwelling cluster area.	Lead paint, asbestos.	
	Shed 1	Metal construction. Stained concrete floor. Mechanical works within. Small number of batteries stored alongside shed.	Yes.	Metals, TRHs, BTEXN, PAHs, OCPs, OPPs.	
	Storage shack / cool room	Possible slaughter house. Concrete floor, timber clad, metal roof.	Low risk though will require investigation as it is located in a proposed dwelling cluster area.	Lead paint, asbestos.	

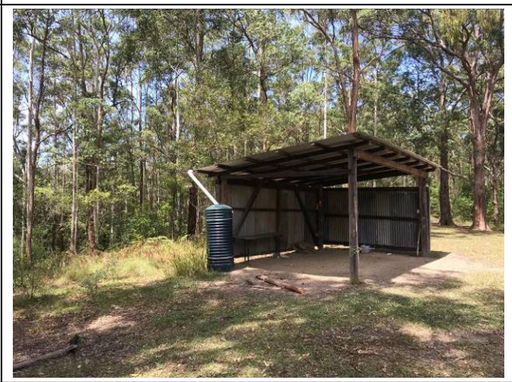
Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 2 DP1148316	Mechanical shed	Metals roof and walls. Carpet overlying soil. Mechanical work including engine work, spray painting. Car parts, tractor, batteries.	Yes.	Metals, TRHs, BTEXN, PAHs, OCPs, OPPs.	
	Shed 2	Metal roof and walls. No flooring. No significant staining evident. Concrete water tank. Empty IBC.	Yes.	Metals, TRHs, BTEXN, PAHs, OCPs, OPPs.	
	Rubbish pile 1	Approximately 20 m^3 of domestic rubbish including whitegoods.	Low risk – generally inert though needs to be removed and appropriately disposed.	N/A.	

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 2 DP1148316	Pump 1	Petrol powered water pump drawing from creek, with disused adjacent pump. 20 L fuel in plastic container stored adjacent to pump. Caretaker advised recently flooding washed tops oil away. No major staining evident.	Low risk, though warrants sampling.	Lead, TRHs, BTEXN, PAHs.	
	Cattle yard 2	Timber fencing, well grassed. No evidence of dip or spray race.	Low risk, though may warrant low density sampling.	Metals, OCPs.	
Lot 20 DP755714	Demolished structure 1	Foundation stumps. Small volume of domestic rubbish including jerry can, metal and timber.	Low risk – generally inert though needs to be removed and appropriately disposed and potential residues assessed.	Metals, OCPs, TRHs, BTEXN, PAHs.	
	Demolished structure 2 or preparation for new building	U brackets installed in ground, pad for water tank.	No.	N/A.	-

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 20 DP755714	Demolished structure 3	Log roof frame, abandoned van with outdoor sink at rear. Timber floor frame. Metal lean-to. Domestic rubbish bins.	Low risk – generally inert though all anthropogenic materials should be removed.	N/A.	
	Pad cleared	Level pad excavated into hill side.	No.	N/A.	-
	Building materials 1	Reinforcement mesh and other metal materials. Some timber.	Low risk though all anthropogenic materials should be removed.	N/A.	
	Saw mill 1	Diesel engine. Two cutting blades. Water tanks. Staining on exposed ground. Metal roof, no walls.	Yes.	Metals. OCPs, TRHs, PAHs.	

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 20 DP755714	Cattle yard 1	Timber fencing. No evidence of dip or spray race.	Low risk, though may warrant low density sampling.	Metals, OCPs.	
	Bus	Not inspected up close due to access issues.	Low risk though must be inspected and removed if not in use.	TRHs and PAHs if staining is evident on ground.	
	Sawn timber	Small pile of cut timber.	No.	N/A.	-
	Timber stack	Small pile of rough sawn timber.	No.	N/A.	-
	Shed 3	Metal construction with raised timber floor. Shelving inside. Battery and irrigation parts outside shed. Documents in domestic rubbish bin dated 2016.	Low risk, though may warrant low density sampling if not an ongoing use.	Metals, OCPs, OPPs, TRHs, BTEXN, PAHs, herbicides.	
	Battery 1	Single battery on ground beside empty wooden cabinet.	Low risk – battery must be removed and disposed.	N/A.	-

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 20 DP755714	Bath shed	Metal and timber shed with timber floor containing showers, sinks and a toilet. IBCs used for water storage with an inline filter on the plumbing. Hot water – possibly connected to solar panels in the past. Adjacent clothes line, hanging frame and small number of banana plants.	Low risk, though may warrant low density sampling around bananas and under hanging frame.	Metals, OPPs, herbicides.	
	IBC 1	Empty IBC originally containing Purasal Lite S/6, a sodium/potassium salt product used for preserving meat.	Low risk given IBC use for water storage at adjacent bath shed.	N/A.	

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 11 DP1194471	Clearing / quarry	Cleared area against side of hill. Excavation evident with soil / rock rubble. No staining or machinery evident.	No.	N/A.	
Lot 121 DP134446	House 2	Metal, fibro, timber construction. Metal roof. Water tank. Miscellaneous storage.	Low risk and may not warrant investigation if ongoing use is proposed.	N/A given that the house was constructed after 1997.	
	Other dam 1 and 2	Not inspected.	Possible contaminant sink and staining if pump is/was present (sediment to be assessed).	Metals, TRHs, BTEXN, PAHs, OCPs, OPPs and herbicides.	-
Lot 35 DP755714	Camp 6	Camping area with open sided metal shed and plastic water tank, abseiling frame or equivalent, wooden seating and camp fire area.	No.	N/A.	

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 2 DP611556	Piggery	Former piggery as advised by property owner Mr Peter Van Lieshout. No evidence of former buildings, no hardstand. Caravan in poor condition with timber construction 'annex' present to the south of the former piggery area	Yes.	Metals, OCPs, TRHs, PAHs	
	Dam 2 and Dam 2 pump	Two pumps beside dam. Staining on ground beside east pump as shown.	Yes – staining on ground and dam as possible contaminant sink.	Metals, TRHs, BTEXN, PAHs, OCPs, OPPs and herbicides.	

Allotment	Feature	Description	AoPC	PCoC	Photograph
Lot 2 DP611556	Hay shed	Metal construction. Hay bale storage.	No.	N/A.	
	House not GT 2	House / structures not inspected and ground truthed as tenant denied access.	Unknown.	Unknown.	-
	Camp amphitheatre 2	Camping ground with large timber and metal 'amphitheatre' – communal shelter. Composting toilet and water tank. Wooden seating and camp fire area.	No.	N/A.	
	Cropping area	Relatively small scale cropping with hemp and banana plants on land gentle sloping down to the west.	Yes.	Metals, OPPs, herbicides.	
Lot 1 DP611556	House not GT 1	House / structures not inspected and ground truthed as tenant denied access. Includes several sheds, a home, and a ~1,000 L above ground storage tank (AST)	Yes.	Lead, TRHs, BTEXN, PAHs as a minimum.	-